Chronic empyema of the ethmoidal and frontal sinuses, with exophthalmos : operation, death from menigitis, autopsy / by Arnold Knapp.

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M. P., thirty-four years old; has never had any discharge or occlusion of the nose. According to the patient, seven years ago a swelling appeared near the nose, pushing the eye out. This was operated upon. She ceased treatment before the wound was closed and was comfortable until two years ago, when the condition recurred. This was again relieved by a slight operation. The old condition returned and became more accentuated two months ago, when she experienced severe headache and diplopia.

On admission, a heavily-built, healthy woman. The left eye is pushed out and down by an elastic, painless, round swelling, occupying the inner and upper walls of the orbit. V $\frac{20}{10}$. Od. normal. The nose is clean. No discharge. No hypertrophies; the outer wall of the middle meatus is bulging inward.

Operation, Sept. 18, 1902.—Curved incision along upper and inner orbital margins. In separating the periosteum at the orbital margin, a cavity is opened and a great quantity of thick, chocolate-colored fluid is evacuated. On wiping this dry, the cavity is seen to be formed by the dilated frontal and ethmoidal sinuses extending over the orbit and bounded internally by the inner wall of ethmoidal labyrinth. The outline of the middle turbinal is distinctly visible. The floor of the frontal sinus shows a large central defect; an irregular plate of bone remains at the anterior, external, and posterior margins. The orbital periosteum is thickened and fills in this defect. The os planum is completely

[1] Read with demonstration of specimen at the meeting of the Section of Rhinology, etc., New York Academy of Medicine, February 25, 1903.

Reprinted from the Archives of Ophthalmology, Vol. xxxii., No. 3, 1903.

gone; the ethmoidal labyrinth, except for the presence of a few posterior ethmoidal cells, is converted into a bone cavity, showing only an inner and lower wall (middle turbinal). The entire area is lined by a very thin membrane, the old mucous membrane. The bone underneath is smooth. At the edges posteriorly and externally diverticula and septa remain which are smoothed away. The frontal sinus has no lining membrane, and the bone appears superficially diseased, brownish, and can be peeled off like parchment (tabella vitrea). A broad opening is made into the nose, throughout the middle meatus, and the middle turbinal is completely removed. Anteriorly the nasal process of superior maxilla is partly resected. Some of the posterior ethmoidal cells, situated far back and next to the septum, are apparently diseased and are opened up externally. The wound is packed from in front.

Sept. 19th.—T. 100.6°. P. 90. Complained somewhat of headache. Vomited a considerable quantity of blood.

Sept. 20th.—Complained of her throat and also her stomach. Some headache. T. went up to 103.6°. P. 112.

Sept. 21st.—A restless night. Complained of pain in the right eye and headache. T. remained at 103°. In the afternoon slightly delirious. Pain in the back of head and neck. Swallowing difficult. In the evening became restless and attempted to get out of bed.

Sept. 22d. — T. rose to 104°. P. 100. Partly delirious, though answers questions. Very restless, complains of pain in the head. Palpation of back of neck painful. The wound was dressed. Gauze removed. There seemed to be no retention of pus. The cerebral wall of the frontal sinus healthy. The nose was irrigated. In the afternoon the condition has not changed. She has taken nourishment. The left pupil was found dilated. No change in the eye ground.

Sept. 23d.—Restless during the night except when under the influence of morphine. At six o'clock in the morning her condition became suddenly very much worse. Later her breathing was more rapid. T. 106°. Pulse could not be counted, and at 10 A.M. she died.

Autopsy, 8 P.M.—After removing the calvarium, the dura appeared normal. There was purulent meningitis over the convexity, more on the left than on the right side. On lifting the base of the brain, the right olfactory bulb was found imbedded in

pus. A very pronounced purulent collection was situated further back, surrounding the pons and the anterior extremities of both cerebellar lobes. Pus was seen to continue into the spinal canal. The ventricles contained cloudy fluid. The brain itself and the sinuses were normal. On examining the dura on the floor of the anterior cerebral fossa a small coagulum of blood and pus was seen to cover an opening in the membrane at the posterior extremity of the left cribriform plate. The opening in the dura was round, 2–3 *mm* broad, with thin and discolored margins. The roof of the orbit and of the nasal cavities was removed, showing the defect in the left orbit produced by the operation. There was no retention of pus. The septum and horizontal wall, roof of ethmoidal cells, and orbit remain; there are a few posterior ethmoidal cells. These and the adjoining mucous membrane are covered with discolored granulations, which at one point passed through the bony roof of the lamina cribrosa to the under surface of the dura. The posterior wall of the frontal sinus was normal. The sphenoidal sinus was opened and found healthy. The right cribriform plate was also healthy.

REMARKS.—The active process in this case was a disease of some of the posterior ethmoidal cells, which appear to have been closed off by the dilated empyematous cavity, obstructing drainage and causing an extension upwards, as shown by caries of the lamina cribrosa and circumscribed pachymeningitis. These latter changes are of some duration and presumably not produced by the operation. At the same time there is no question but that the operation started the meningitis under the existing diseased conditions. Examples of the lighting up, so to speak, of a latent meningeal process are not unusual.